

PART II.

TUBERCULOSIS AS A DISEASE OF THE NATIVE INDUSTRIAL
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CHAPTER I.—THE PRINCIPAL INDUSTRIES AND OCCUPATIONS IN WHICH NATIVES ARE ENGAGED IN SOUTH AFRICA.

The Native (Bantu) population of South Africa in 1930 is estimated on a basis of the 1921 census (the last taken), and the percentage increase indicated by the censuses of 1911 and 1921, at 6,000,000, of whom approximately 2,000,000 are males between the ages of 15 and 50, the latter estimate being based on data presented in the last census report.

The population of the three adjacent territories of Basutoland, Bechuanaland and Swaziland is approximately 1,000,000, of which 300,000 are males between the ages of 15 and 50. (Official Year Book, Union of S.A., No. 11, 1928-1929.)

Thus, we have a potential male labour reservoir of approximately 2,300,000 in British South Africa.

From various available sources, such as the Official Year Book of the Union of South Africa (No. 11, 1928-1929) and the "Report of the Inter-departmental Committee on the Labour Resources of the Union," March, 1930, the following table (Table 1) of the principal industries employing adult male Natives was compiled :—

Industry.	Number of Adult Male Natives Employed.
Gold Mining	208,000
Diamond Mining	61,000
Coal Mining	33,000
Other Minerals	15,000
Railways	36,000
Trades and Industries	97,000
Domestic Employment	111,000
Government Departments (Union, Provincial and Local) ...	54,000
Agricultural (exclusive of Native peasant farmers) ...	375,000
Total	<u>990,000</u>

Tables given in the above referred to Report of the Inter-departmental Committee show that the estimated number of adult male Natives engaged in certain occupations in December, 1929, was as follows (Table 2) :—

TABLE 2.

	Number of Adult Male Natives Employed.
Agricultural labour, (exclusive of Native peasant farmers) ...	375,716
Mining	261,094
Alluvial Diamond Diggings	28,694
Commerce, Trade and Industries	97,316
Domestic Service	111,361
Local Government	27,221
Union and Provincial Government	27,564
Railways	33,626
Total	<u>962,592</u>

The same Report draws attention to the fact that of this number approximately 225,000 are non-Union Natives. To this one should add that of this 225,000 some 96,000 are Natives from Portuguese territory employed on the gold and coal mines of the Transvaal. Presumably, therefore, the remainder of approximately 125,000 is made up very largely of Natives from the territories of Basutoland, Bechuana-land and Swaziland.

The same Inter-departmental Committee states that, after making a very careful estimate, it has arrived at the conclusion that the Natives employed in various industries on the average devote only 44 per cent. of their time to such employment, aside from their own agricultural and other activities. This is borne out by the experience of the gold mines, where the annual "turnover" approximates 100 per cent.

The phenomenon to which attention is drawn by this statement is one which should be borne in mind in any comparison which might be made between the morbidity and mortality statistics of the mining industry set forth in this Report and similar statistics from other parts of the world, where this phenomenon plays no important rôle. But, on the other hand, it should be remembered that although the annual "turnover" is high, a considerable number of Natives return again and again after variable periods of absence to industrial occupations such as mining. Thus, the proportion of Natives with a cumulative period of over five years of continuous and discontinuous work on the gold mines of the Witwatersrand is approximately 11 per cent. of the total force, and of those of over one year of service and up to five years is approximately 67 per cent. It appears, therefore, that at any one time there are apparently on the mines some 78 per cent. of Natives who have worked for a complete year, or more than a year, continuously or discontinuously.

It seems clear from the above data that an exact weighing of the morbidity and mortality experience with Natives on the gold mines, or, for that matter, in any industry in the Union employing Natives, to enable comparison with similar experience in more settled industrial populations, is impossible, and even a close approximation can hardly be arrived at on the data at present available.

It would appear advisable at this point to state briefly certain facts which have a bearing on the health of Natives employed in South African industries other than gold mining.

(a) *Agricultural Labour*.—The Native workers in agriculture in South Africa are either squatters on farms or casual labourers recruited in one way or another; in the case of the smaller farms, in the immediate neighbourhood of the farm, and in the case of larger enterprises, such as sugar-farming, from various parts of South Africa. With few exceptions, no special provisions are made for the feeding of these Natives and their housing is, as a rule, primitive, approximating that of the Native kraal hut. On the larger plantations, medical services, including hospitals, are provided, but such provision is available only to a relatively small portion of the total number of agricultural workers, which must in the aggregate be over half a million. Morbidity and mortality statistics for this class of workers, are, of course, not available.

(b) *Alluvial Diamond Diggings*.—The conditions on these diggings are much like those prevailing in agriculture. The Natives come and go. Sometimes a ration of mealie meal and an occasional ration of meat are issued, but generally speaking they must provide their own food. There is no medical examination on engagement, and no medical provisions, except such as might be available to the population of the neighbourhood, are made. For this class of Native also no morbidity or mortality statistics are available.

(c) *In Commerce, Trades and Miscellaneous Industries* in the towns, the general conditions described under (b) prevail, except that the housing is usually superior to that obtaining on farms and alluvial diggings.

(d) *In Domestic Service* the Natives, in addition to their wages, receive food and quarters, the latter being as a rule quite adequate.

(e) The Native employees of *Government, Local Authorities and Railways* are on the whole better housed and fed than in the previously described employments, but there are among these a considerable number, which might be estimated at about 50 per cent. of the approximately 90,000 thus employed, who receive a wage only and are neither housed nor fed. For these Natives no separate morbidity and mortality statistics are available.

(f) *On the Diamond Mines* the conditions of housing, feeding and medical care approximate those of the gold mines. The labour force is, however, almost entirely of British South African origin. Morbidity and mortality statistics are available and their general trend approximates those for the gold-mining industry. As these mines do not come under the provisions of the Miners' Phthisis Act and Regulations and consequently no initial, periodic and final examinations, with special reference to tuberculosis, are made, the incidence of this disease cannot be stated as definitely as that for the gold-mining industry.

(g) *Collieries.*—The principal collieries of the Union are situated in the Transvaal and in Natal. In the Transvaal collieries the tribal composition of the labour force is approximately that of the gold-mining industry, with perhaps a slightly larger proportion of East Coast Natives.

In the Natal collieries there is a difference in the composition of the force because on these collieries a considerable number of Asiatics of Indian origin are employed.

These mines, also, do not fall under the provisions of the Miners' Phthisis Act and Regulations, and consequently the physical standard of the Native employees is on the whole not so good as those of the gold mines, and for the same reason the incidence of tuberculosis cannot perhaps be as exactly stated as that for the gold mines. The general trend of mortality from disease is higher on the collieries than on the gold mines, and that is probably due to the lower physical standard of the Natives, and, to some extent, to the generally inferior hygienic conditions under which they live.

CHAPTER II.—THE GOLD-MINING INDUSTRY AND HEALTH.

SECTION A.—THE NATIVE MINE WORKERS.

1. RACES AND AREAS FROM WHICH NATIVE MINERS ARE OBTAINED.

Approximately 200,000 Natives are employed on the gold mines of the Witwatersrand.

A little more than half of this number is obtained from areas within British South Africa, of which the largest portion consists of members of the Xosa, Fingo and Pondo tribes of the Transkei and Ciskei areas of the Cape Province; the second largest portion consists of Natives from the three British Protectorates, viz., Basutoland, Bechuanaland and Swaziland; while the smallest portion is comprised of the tribes of the Northern Transvaal and Zululand. All these Natives are commonly referred to as British South African or, more briefly, B.S.A. Natives.

The remainder of the Native labour force is obtained from Portuguese East Africa (south of latitude 22° South), and consists of the Mchopi, Nyambaan and Shangaan tribes collectively known as "East Coast" Natives. At one time Natives from areas north of latitude 22° South, classified as "Tropicals," were engaged for mining employment, but owing to their susceptibility to pneumonia their introduction into the Union for mining employment was prohibited in May, 1913, by the Government of the Union of South Africa.

2. METHODS OF RECRUITMENT.

Recruiting of Native labour for the gold mines is conducted entirely by the two Native labour organizations of the industry, viz. :—

- (a) The Native Recruiting Corporation, which operates in British South Africa, and
- (b) The Witwatersrand Native Labour Association (W.N.L.A.), which operates in Portuguese East Africa.

(a) *British South African Natives.*

About one-half of these Natives are not, at the time of leaving their kraals, engaged under contract to the mines, but voluntarily proceed to the Witwatersrand and there seek mining employment. These Natives are classified as "Non-recruited from Territories." The remainder contract themselves for work on the mines through representatives of the Native Recruiting Corporation stationed in the various districts of the Native territories. These representatives advance the rail-fare to Johannesburg and the train ration and, if he wishes it, also money to provide for the needs of his family. These Natives are classified as "Recruited Natives."

(b) Portuguese East African Natives ("East Coast" Natives).

These Natives are obtained by the Witwatersrand Native Labour Association. Natives desiring employment, either on the gold mines or the collieries, voluntarily proceed to one of the many stations established and maintained by the Association in Portuguese East Africa. From these stations the Natives are transported to the Association's central depôt at Ressano Garcia, situated within five miles of the eastern border of the Transvaal. From this depôt the Natives for the gold mines are forwarded, under the care of a European conductor, by special bi-weekly trains to the Association's main distributing depôt at Johannesburg. The cost of transport, together with incidental items—including a clothing outfit—is advanced to these Natives.

(c) Medical Examination in the Native Territories.

The British South African "Non-Recruited" Natives are naturally not, prior to leaving for the Witwatersrand, medically examined as to their fitness for mine work; their first examination in this respect is at the mine which engages their services. On the other hand, the recruited Natives, with the exception of a few from areas where medical services are not available, are medically examined by a local practitioner—usually the Government District Surgeon. These examining officers are furnished for guidance with a schedule drawn up by the Transvaal Mine Medical Officers' Association of disabilities debarring Natives from mine employment, especially diseases of the lungs.

East Coast Natives who are obviously ill, disabled or diseased are eliminated at the various subsidiary stations in Portuguese East Africa. The remaining Natives, comprising gangs of between 300 and 400 twice weekly, are submitted to a stethoscopic and general examination and to re-vaccination, where necessary, by the two medical officers (one whole-time and one part-time) employed by the W.N.L.A. at its depôt hospital at Ressano Garcia.

(d) Medical Examination on the Witwatersrand.

Every Native for employment underground on the gold mines, whether non-recruited or recruited, and from whatever area, is submitted to a strict medical examination at the W.N.L.A. distributing depôt, prior to entering upon his contract. As already stated, the non-recruited Native will have been first examined by the mine medical officer. If accepted by him for mine work, the Native is subjected to a further examination at the W.N.L.A. depôt.

In the case of the recruited Native, this sequence of examination is reversed, and a Native considered by the mine medical officer as unfit to commence work is returned to the depôt for re-examination—clinical and radiographic—and probable detention in the depôt hospital.

3. CONTRACTS AND TERMS OF SERVICE.

(a) British South African Natives.

On attestation in the Native Territories, the recruited Native names the mine where he wishes to work, and thereupon contracts for 270

worked shifts,* except in the case of the Bechuanas and Swazis, who usually contract for 180 worked shifts.

The non-recruited Native proceeds direct to the mine of his choice and engages for a period mutually agreed between himself and the mine authorities, usually from three to four months, but occasionally on a monthly basis.

(b) *Portuguese East African Natives.*

East Coast Natives proceeding from their kraals to the mines are contracted for an initial period of 313 worked shifts, but in terms of the Convention concluded between the Portuguese and Union Governments in September, 1928, Natives may re-engage for a further period or periods not exceeding 156 worked shifts, upon the completion of which the Native is, in terms of the Convention, called upon by the Portuguese authorities to return to Portuguese territory.

(c) *Local Natives (all Tribes).*

(i.e., Natives who transfer from one mine to another upon the completion of their contracts or who proceed from other employment in a labour district to employment on the mines.)

These Natives are free to engage in the same manner as non-recruited Natives.

In each of the foregoing cases, the contract is ratified by the issue to the employer and to the Native of the "service contract" prescribed by Government Regulations.

Service beyond the registered period can be terminated by the giving of seven days' notice on either side.

4. THE JOURNEY TO JOHANNESBURG.

It will be gathered from the foregoing sections of this Chapter that many of the recruits for the mines have a lengthy journey from their homes to Johannesburg. This applies at present particularly to the East Coast Natives drawn from the northern portion of the Mozambique recruiting area and used to apply to the Tropicals.

The following extract from a paper "The Recruiting Organizations of the Gold Mines," read before the Empire Mining and Metallurgical Congress, 1930, deals with the transportation functions of the Witwatersrand Native Labour Association in Portuguese East Africa.

"When the Association first entered Portuguese East Africa, the initial difficulties were great owing to drought, fever, absence of communications and, in summer, the difficulty of transport through floods, but to-day its organization is such that a Native in almost any portion of the area can present himself at a W.N.L.A. station within a day of his leaving home. The work of the Association's officials in Portuguese

* A "worked shift" is the period in any twenty-four hours which is spent by the worker continually at his work. In other words, the Native contracts for so many working days, not so many calendar days.

territory consists mainly in keeping in close personal touch with the Native population, and in supervising the elaborate and constantly changing arrangements made to facilitate the journey of the Natives to the Rand. No pressure of any description, either from the Association's officials, from the Portuguese authorities, or from the local chiefs, is applied to induce the Natives to proceed to work on the Witwatersrand. The flow of Natives from Portuguese territory to the mines is indeed a voluntary flow in the fullest sense. Current hut-tax and such transport expenses as are not paid by the Association are advanced by it free of interest and are recovered from wages.

"The Association employs 95 Europeans and 771 Natives. Its organization is managed from Johannesburg through two District Managers in Portuguese territory, under whom are four Assistant District Managers in charge of the four areas into which the Association divides the territory, viz., Inhambane, Chai Chai, Lourenço Marques-Xinavane, and Pafuri. As already indicated, the organization is established on the basis that any Native should be able to reach a W.N.L.A. station within twenty-four hours of his leaving home. At these stations, of which experienced Natives are in charge, the recruits are fed, and forwarded either on foot from station to station or direct by motor transport to one of the Association's main camps. There they are medically examined and, if passed as fit, proceed to the Transvaal frontier. On arrival at the frontier the Natives undergo a further medical examination, and are then presented to a Portuguese Government official who rejects any whom he considers to be under eighteen years of age or otherwise physically unfit. They are provided with a clothing outfit consisting of two blankets, a cotton vest and a large loin cloth at a charge of 20s., and sent forward by rail in the care of conductors to the Association's depôts at Johannesburg, Witbank or Breyten, where they are again medically examined, in some cases detained for a short time to recuperate, and distributed to the mines."

In the case of Natives recruited by the Native Recruiting Corporation in British South Africa, the transportation arrangements for the journey to Johannesburg are fairly similar.

Before ever the employee arrives at the mine to which he is allotted he has already, therefore, been in close contact with strangers.

It has long been recognized that Natives, from the point of view of their health, do not react well to being moved about and to being brought into contact with strangers.

Writing in 1905, Irvine and Macaulay⁴⁶ stated in connection with the high sickness and mortality rates obtaining for Tropical Natives—

"But further investigation reveals the important qualifying fact that the excessive susceptibility to disease of these Natives is not a permanent feature . . . the significant fact appears that this incidence falls with exceptional severity upon new arrivals . . . among the Natives allotted during the seven months from June to December, 1903, the mortality was at the rate of 63 per 1,000 per annum. Of the Natives

who died, 45.2 per cent. died within one month after allotment to the mines. After one month's service the mortality steadily declines, and after three months' service the fall is striking."

Dr. A. I. Girdwood, Principal Medical Officer to the W.N.L.A., states that it was quite the usual thing to admit 100 cases of Tropicals to the Witwatersrand Native Labour Association's hospital from a batch immediately on arrival, and that there were always cases of pneumonia on the train.

To turn to present conditions, Dr. Girdwood gives the following information:—During 1928, out of 44,297 East Coast recruits received, 2,119 were admitted to hospital, while out of 49,210 B.S.A. recruits received, 1,313 were admitted. The East Coast Native contributed 107 cases of pneumonia as compared with 12 cases contributed by B.S.A. All Natives are medically examined before starting, yet of 93,507 presumably healthy Natives, 3.67 per cent. were, on arrival, sick enough to be admitted to hospital. A further examination shows that the figures were about 4.7 per cent. for the East Coast Natives and about 2.6 per cent. for the B.S.A. Natives, suggesting that the more arduous journey and greater change of climate had affected the East Coast Natives adversely as compared with the B.S.A. Natives, although the latter had not escaped.

The figures for 1929 and 1930 are available for comparison. In 1929 the East Coast admissions on arrival amounted to 4.3 per cent. of the recruits examined, and the B.S.A. admissions to 3.0 per cent. In 1930 the East Coast admissions were 3.7 per cent., while the B.S.A. admissions were 4.9 per cent. It will be seen that with respect to the matter under consideration, while the East Coast Natives have been steadily improving, the B.S.A. Natives have been steadily deteriorating. The travelling facilities for Natives applying for employment on the gold mines are being steadily improved and this is perhaps reflected in the fall in the admissions of East Coast Natives on arrival. In the case of the B.S.A. Natives the recent hard times and discharge of Natives from employment to make room for Europeans has resulted in a great increase in the number applying for work on the mines and a great falling off in the average physical standard of the applicants. This experience may be illustrated.

A certain proportion of the Natives admitted to hospital on arrival at the depôt are admitted because they are physically below par, and they are kept back for rest and feeding-up before being distributed to the mines. In 1928 this quota accounted for 4 per cent. of the B.S.A. admissions; in 1929 for 5 per cent.; and in 1930 for 23 per cent. It must be understood that these figures deal with Natives other than those applicants who are definitely rejected as being unfit physically for employment on the mines. The proportion of all recruits admitted on arrival during 1930 was 4.4 per cent. as compared with the 3.67 per cent. in 1928, so the improvement anticipated from better travel facilities has been more than counterbalanced by the poor condition in which the B.S.A. Native starts on his journey.

The questions as to relationship, if any, between season and number of admissions or between size of gangs and number of admissions have been considered. For the two years 1929 and 1930 Dr. A. I. Girdwood gave the number of recruits received per month and the number of admissions per month. There is no relation between the season of the year and proportion of recruits admitted or between number of recruits per month and proportion admitted. Table 3 shows the figures.

TABLE 3.

Month.	No. of Recruits.	No. of Admissions.	Admissions, %
January	8,980	463	5.1
February	6,174	323	5.2
March	5,951	252	4.2
April	6,074	263	4.3
May	5,753	186	3.2
June	6,257	305	4.8
July	7,040	366	5.2
August	8,372	285	3.4
September	9,159	308	3.3
October	10,558	436	4.1
November	7,756	267	3.4
December	8,310	269	3.2

The Table just given deals with East Coast Natives only, but an analysis of the figures for the B.S.A. Natives yielded a similar result.

Out of 700 consecutive post-mortem examinations performed on mine Natives of all lengths of service nearly 18 per cent. were on subjects who had died within one month of their arrival on the Reef.

While the gold mines and collieries draw their labour from a distance and assemble parties from different districts before delivering them to their mine, the De Beers Diamond Mines secure their labour locally and employ no agencies either for enlistment or transport. In response to an enquiry the General Manager replied: ". . . Our experience is not comparable with the experience on the gold mines as to an excess of sickness amongst new arrivals."

One must conclude that, for gold mines, the journey and its associated conditions are responsible for sickness on arrival, and the aftermath contributes to the relatively high sickness rate immediately after arrival. It is obvious that no amount of attention on the mines will deal adequately with this factor: mischief is done before the men are received.

Exactly which elements of the journey and its associated conditions can be blamed for this state of affairs it is hard to say, but it seems reasonable to suspect (a) the sudden transition from a tropical or sub-tropical climate to that of the high veld; (b) the close contact into which Natives are brought with strangers and the possibilities thus occurring of bacterial infections.

The Committee is unable to arrive at any definite finding on this question. It is aware that considerable improvements have taken place in late years in the attention paid to creature comforts on the journey but, in view of the still existing excessive sickness rate in new arrivals, it recommends that further enquiry should be made.

It suggests that the first avenues to be explored should be (a) the value of further protection against climatic changes en route, and (b) the value of keeping gangs from different localities as far as possible isolated from each other during the journey and their early days on the mines.

5. REPATRIATION OF NATIVES.

(a) *Time-expired Natives.*

Natives leaving a gold mine, either for return home or for further employment, are medically examined by the Mine Medical Officer in terms of the Miners' Phthisis Act (No. 35 of 1925) and, if found as prescribed in the Act to be free from tuberculosis or silicosis, their service contracts are endorsed accordingly.

In the case of those discharged fit, British South African Natives make their own arrangements for the homeward journey. East Coast Natives, however, are, in terms of an Agreement supplementary to the Convention, repatriated under the aegis of the Witwatersrand Native Labour Association.

There is no further medical examination of these East Coast Natives on their arrival at the W.N.L.A. depôt, Johannesburg, except of those who complain of being sick or who are obviously ill; whereupon they are admitted into the depôt hospital.

(b) *Natives Medically Unfit for Employment.*

Convalescent Natives discharged by the gold mines as unfit to resume employment are, as a preliminary measure, forwarded to the central hospital maintained by the Witwatersrand Native Labour Association at its Johannesburg compound. Here they are medically examined to determine their fitness to travel and in due course are forwarded in specially equipped rail coaches to the rail-point nearest their home, from whence, if necessary, they are further transported under the care of trained Native orderlies.

6. HOUSING CONDITIONS.

The Native mine labourers of the Witwatersrand are housed in what are locally known as "compounds." Only an insignificant proportion have their wives and families with them, the total number of these being a fraction of 1 per cent.

The compounds, in which male labourers alone are housed are in the nature of barracks, usually arranged in the form of a quadrangle, with kitchens, ablution rooms and latrines placed in the middle of the square, although sometimes the latrines are outside the square and connected thereto by a covered passage.

The individual rooms of the compounds usually house from 10 to 50 Natives, although there are a few exceptionally large rooms housing up to 60 and, in very exceptional circumstances, 100 Natives. The Regulations prescribe the following essential structural requirements for compound rooms :—

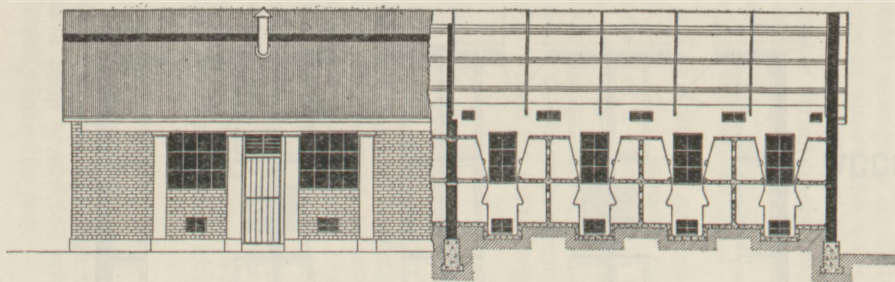
- (1) That each occupant be allowed 200 cubic feet of air space, and that for this calculation not more than 12 feet of the available vertical space be taken into account.
- (2) That the walls be of brick or concrete.
- (3) That the glazed window area bear a ratio of 10 per cent. to the floor area.
- (4) That no more than two tiers of bunks be provided.
- (5) That the rooms be adequately ventilated.

These Regulations came into force in 1911. Compound rooms built prior to the introduction of these Regulations and which did not conform to them were allowed to exist until radical structural alterations became necessary, so that there are still a few rooms of this type in existence. The bulk of the rooms at present occupied conform to these Regulations, and a great many are structurally considerably above these requirements.

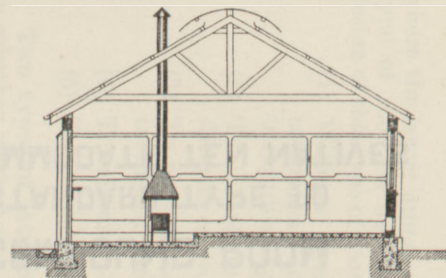
The typical room built since 1911 is oblong, built of brick, with a corrugated iron roof supported on wood, wood-frame windows and a wooden door. Ventilation is by means of air bricks or louvres just above the floor level and open space either at the roof ridge, or between the wall and the roof overhang. It is electrically lighted, and has an iron chimney with a cupola, under which a brazier for heating is placed. The floor is of concrete. The bunks are arranged in the form of two shelves, one about two feet from the floor, and the second about six feet from the floor, placed as a rule along two sides of the room only. The bunks are of wooden boards, and are supported on an iron frame.

It was recognized in about 1914 that these sleeping arrangements, bringing, as they do, the occupants into intimate contact during sleep, would facilitate the transmission of infection from individual to individual, not only through contact but also through the projection of virus carried in droplets of sputum at expiration, and since that date new rooms have been constructed in such a way as to separate the sleepers by means of partitions, and also since then the wooden sleeping shelf has gradually been replaced by reinforced concrete with a covering of some non-heat-conducting substance.

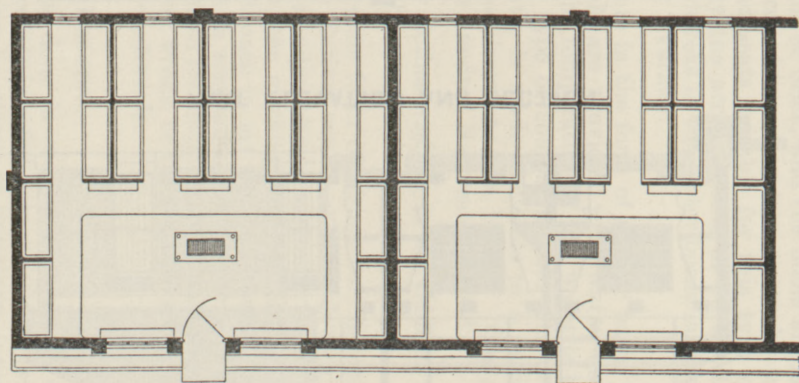
The most recent standard type of compound room is arranged on what is locally known as the "cubicle" principle, the figures on the two following pages showing one of these in sufficient detail to enable a very fair idea to be formed of the structural arrangements. One of these drawings shows a standard room for 40 occupants, and the other a standard room for 10 occupants. The latter type is preferable



PART ELEVATION AND SECTION.



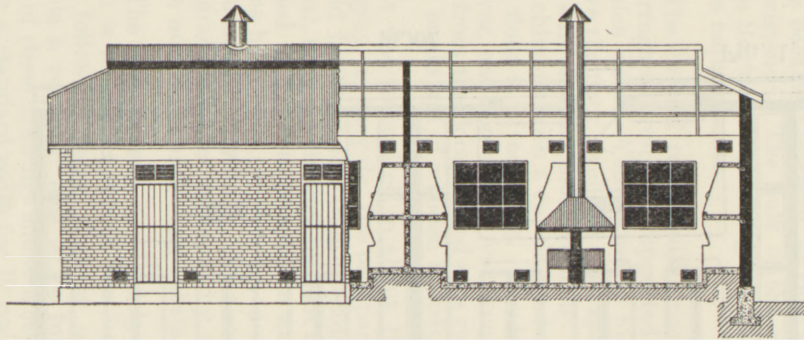
CROSS SECTION.



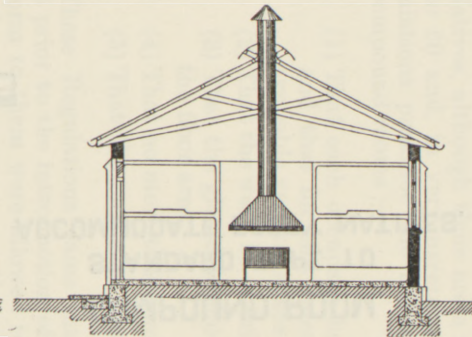
PLAN.

FIG. 1.

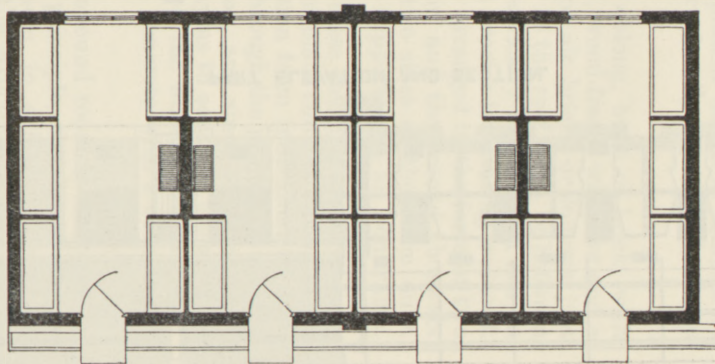
COMPOUND ROOM.
STANDARD TYPE TO
ACCOMMODATE FORTY NATIVES.



PART ELEVATION AND SECTION.



CROSS SECTION.



PLAN.

FIG. 2.

**COMPOUND ROOM.
STANDARD TYPE TO
ACCOMMODATE TEN NATIVES.**

where the larger amount of ground required for a compound with this type of room is available. The underlying principles covering the design of this type of room are :—

- (1) Without significantly greater cost to provide reasonable separation, either by mechanical means, or by intervening unoccupied space, of each individual sleeper.
- (2) To substitute for the movable brazier, with its attendant dangers of fire and CO poisoning, a fixed fireplace.
- (3) To provide adequate ventilation which could not be easily interfered with by the occupants.
- (4) To minimize the danger of infestation with insect parasites.
- (5) To enable the rooms to be easily cleaned and whitewashed.

Two types of latrines are provided in the compounds, depending on whether water-borne sewage is or is not available. Where water-borne sewage is available, the latrines are fitted with the "range" type of closet, the walls are built of brick, and the floors are made of concrete. Where the bucket conservancy system must be used, a similar structure is erected, and seats suitable for this type of conservancy are provided. Usually the arrangements of bucket latrines are of the "squatting" type, whereas in the water-borne latrines they are of the conventional "sitting" variety.

The ablution arrangements are in the form of shower baths which, in the more modern compounds are provided with warm water by means of a calorifier in which the temperature of the water is kept at a constant level. In the older type of compound cold shower baths only are provided, but hot water is made available in a tank from which the bathers draw their requirements in a bucket. One shower is provided for an average of one hundred Natives employed.

Usually there is provision for clothes-washing in the ablution rooms, either in the form of concrete slabs or concrete troughs.

In each compound there is some form of disinfectant, in which all the clothing and bedding of the Natives can be at least de-verminized. This is important, because of the endemicity of typhus fever in certain areas in the Union. As a rule, the clothing and bedding of all the Natives is de-verminized at least once in six weeks, although in some compounds the de-verminization is suspended during the cold months of the year. Where boards are used for sleeping accommodation, these are either boiled once in four to six weeks, or treated with some vermin-destroying substance at the same intervals.

7. FEEDING.

The cooking in compounds is done in central kitchens, in steam-jacketed pots, although more recently in a few compounds experiments have been conducted with cooking by means of live steam introduced directly into the pot.

The diet scale, as laid down by the Government Regulations, with its calorific value and approximate vitamin content, is as follows :—

TABLE 4.
RATION SCALE FOR NATIVE LABOURERS.

ARTICLE.	Minimum Daily Allowance.	Energy Value Calories.	VITAMINS.		
			Water Soluble C.	Water Soluble B.	Fat Soluble A.
Mealie Meal	24 ozs.	2,568	0	0	0
Bread	6 "	441	0	0	0
Beans or Peas	1.5 "	145	0	+ +	0
Beans or Peas Germinated ...	1.5 "	145	+ +	+ +	0
Meat	6.85 "	470	+	+	+
Soup Meat	1.7 "	145	+	+	+
Pea Nuts	2 "	241	0	+ +	0
Sugar	1 "	116	0	0	0
Vegetables	5 "	80	+	+	+
Salt	0.5 "	—	0	0	0
Cocoa	0.25 "	34	0	0	0
Kafir Beer	6 "	Total : 4,385	—	—	—

0 = Absent.

+ = Present.

+ + = Abundant.

The meat provided for in these Regulations is used in the following ways :—

The entrails, heads, hoofs, a certain amount of meat and fat, and certain bones are cooked with vegetables into a stew and issued daily, and generally a total of about 3lb. of the meat is issued to the Natives raw on two or three days of the week. This meat the Natives grill on the fires in their rooms.

The bread is issued at the time of going on shift in the morning, and is supposed to be consumed during the day.

The general custom is to have one large meal immediately after returning from work, and this is supplemented by a lighter meal given before proceeding to work. The practice in regard to this meal varies. In some instances, it consists of coffee or cocoa only. On some mines meat-stew with vegetables is issued before going on shift.

The Natives line up for their food issue and are given a certain amount of each of the foods provided, but any Native may return for an additional portion if he so desires.

In considering the diet of the mine Natives, one may look at it from two points of view :—

(a) What the Native usually consumes in his own kraal.

(b) The adequacy of the diet from a physiological point of view.

In his own kraal the Native's staple food is maize ("mealie") flour, supplemented by such plants as may be available in his particular locality and collected by himself or his family. Milk is nowadays consumed but relatively infrequently; meat only very occasionally. The maize flour is as a rule not milled, but ground in a mortar and then sifted. It is usually relatively coarse and contains practically the whole of the maize kernel, except the chaff.

There can be no doubt that the mine diet is vastly superior to the average diet of the Native in his home but, on the other hand, his output of energy is very much greater on the mine than at home. At home the Native as a rule takes only one substantial meal a day. The same is at present the general rule on the mines, although when one considers the amount of work performed by the Native on a mine, it can be reasonably questioned whether the one-meal-a-day custom is a sound one.

From the physiological point of view, the diet is reasonably adequate in all but one particular, and that is in its vitamin A content. Up to the time of writing no data are available as to the exact amount of vitamin A in the Native ration as issued on the mines, but even a cursory examination of its constituents indicates that it is deficient in this constituent. The work of the Mellanbys and others has clearly indicated the important rôle played by vitamin A in the prevention of infection. The study of Cobbett⁴¹ indicates that bad diet and deprivation of fats played an important rôle in the post-war increase of tuberculosis in certain countries. It would seem, therefore, that increase of vitamin A in the diet of mine Natives is a desideratum to be aimed at.

Experiments are now being conducted with a view to finding a palatable and at the same time reasonably cheap source of this vitamin for inclusion in the Native diet.

The work of Henderson and Kelly⁴² in Kenya seems to indicate that calcium content of the diet also plays an important rôle in the maintenance of health. In order to throw light on this point, the calcium content of a number of typical mine Natives' rations was investigated at the South African Institute for Medical Research, and it was found that it varied between 1.28 gramme to 0.53 gramme. Even the lowest amount found would appear to be reasonably adequate.

8. WORKING CONDITIONS.

Only a small number of Natives are engaged in night-work. The typical working day of a Native starts at about 4.30 a.m., when he is wakened to proceed to the shaft-head preparatory to going underground; and it ends at about 3 to 4 p.m., when he returns to the compound. Sunday is a day of rest.

When off work the Native spends most of his time in the open, strolling about in the compound yard and outside, or sleeping, the latter also usually in the open during the day. The only recreation calling for physical exercise in which Natives indulge to any extent is dancing,

but even in this pastime a relatively small number of them participate. Some of the more civilized Natives, negligible, however, in numbers, play football and cricket. About once a week a cinema show, very largely attended, is given in the compound yard, and some of them take part in educational classes organized by various agencies, in which they are given elementary education. It can be said that for the great body of the Natives there are no organized recreative facilities.

In the neighbourhood of each compound there is usually a Native eating-house, where various foodstuffs which the Natives esteem as delicacies are obtainable. These are fairly well patronized, and serve to some extent as centres of social intercourse, or clubs.

At this point it seems convenient to refer to the consumption of alcohol, which might be conceived as playing a serious rôle in the health of the Natives. The sale or giving away of alcoholic beverages to Natives is prohibited by law under severe penalties. Nevertheless, a considerable amount of alcoholic beverages are obtained through illicit agencies, the lucrativeness of this business apparently outweighing the fear of the severe penalty. But although one can observe a small number of drunken Natives any week-end in the neighbourhood of any compound, these are but exceptional instances, the vast majority of mine Natives not indulging in alcoholic excesses of any sort. From a physiological point of view, therefore, the influence of alcohol on the general health of mine Natives can be dismissed as negligible.

When a Native is engaged for underground work, he undergoes a short period of preparatory training, which varies within wide limits on different mines. On some mines this training comprises instruction in a specially-equipped building, where the Native is shown the various tools which he is to use, and told their names and their methods of use. Models are also demonstrated to him of various types of mine workings, and he is shown how to do drilling with a machine, and how best to perform various other operations which he might be called upon to do. At the same time, he is instructed in the various dangers associated with mining, and given instructions as to safe methods of performing his work.

If the mine is a deep one with high underground temperatures, he is then put to work for a period of about 14 days in a working place with a relatively low temperature and good ventilation, so as to acclimatize him to mining conditions. At the end of this period he may be transferred to a hotter working place.

The majority of Natives underground are employed in one of three main occupations :—Drilling, by means of compressed air actuated drills, principally of the jackhammer type ; pushing trucks loaded with ore ; and/or shovelling ore from one place to another, or loading it into the trucks. A small and decreasing number of Natives still do hand-drilling. Experiments performed to assess the output of energy in the various occupations show that the greatest output is in connection with shovelling rock and pushing trucks, and that the lowest output is in machine drilling.

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